Met Office

NEWS

2017: warmest year on record without El Niño

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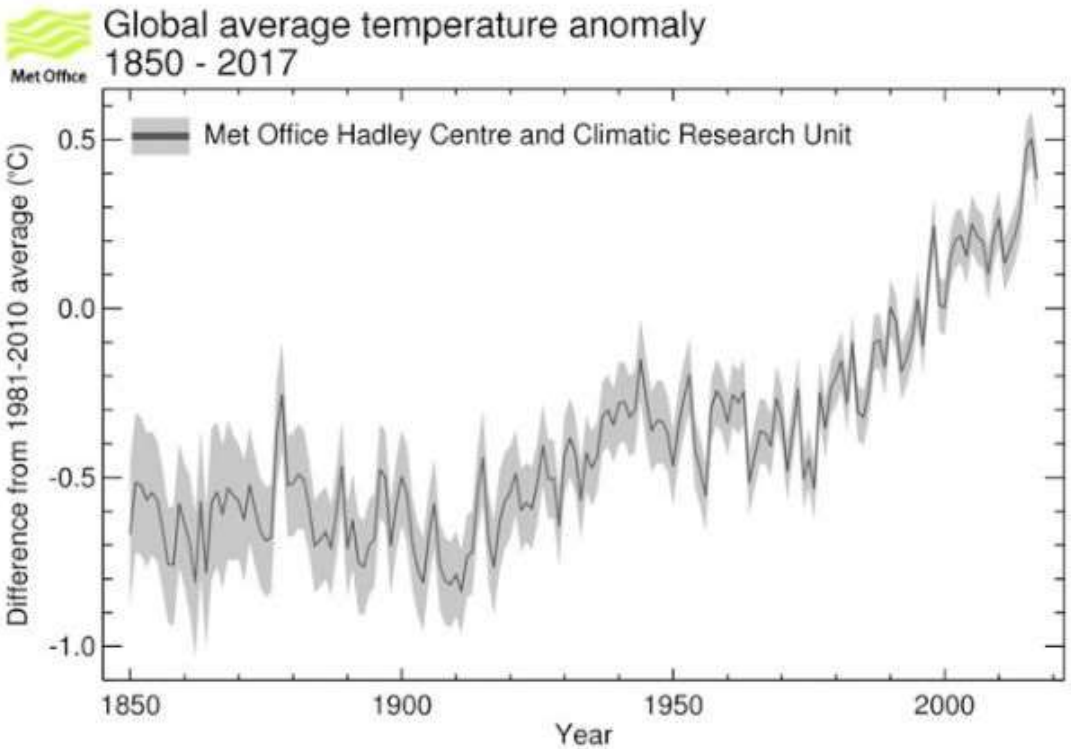
Provisional figures confirm that 2017 was the warmest year on record without the influence of warming from El Niño.

When viewed alongside 2015 and 2016 – both of which were dominated by a significant El Niño – last year was the second or third warmest year for annual global temperatures since 1850.

Scientists at the Met Office Hadley Centre and the University of East Anglia's Climatic Research Unit produce the HadCRUT4 dataset, which is used to estimate global temperature.

The HadCRUT4 global temperature series shows that 2017 was 0.99±0.1 °C above pre-industrial levels, taken as the average over the period 1850-1900, and 0.38±0.1 °C above the 1981-2010 average. 2017 is nominally the third warmest year in the HadCRUT4 series. Figures from other global centres place 2017 as second or third warmest.



Dr Colin Morice of the Met Office Hadley Centre said: “The global temperature figures for 2017 are in agreement with other centres around the world that 2017 is one of the three warmest years and the warmest year since 1850

without the influence of El Niño.

“2015, 2016 and 2017 were the three warmest years in the series. In addition to the continuing sizeable contribution from the release of greenhouse gases, 2015 and 2016 were boosted by the effect of a strong El Niño, which straddled both years. However, 2017 is notable because the high temperatures continued despite the absence of El Niño and the onset of its cool counterpart, La Niña.”

Clare Nasir explains that the global average temperature for 2017 was almost 1 °C above pre-industrial levels (between 1850–1900).

The El Niño event spanning 2015-2016 contributed around 0.2°C to the annual average for 2016, which was about 1.1°C above the long-term average from 1850 to 1900. However, the main contributor to warming over the last 150 years is human influence on climate from increasing greenhouse gases in the atmosphere. 2017 remains close to 1 °C above pre-industrial temperatures (1850-1900).

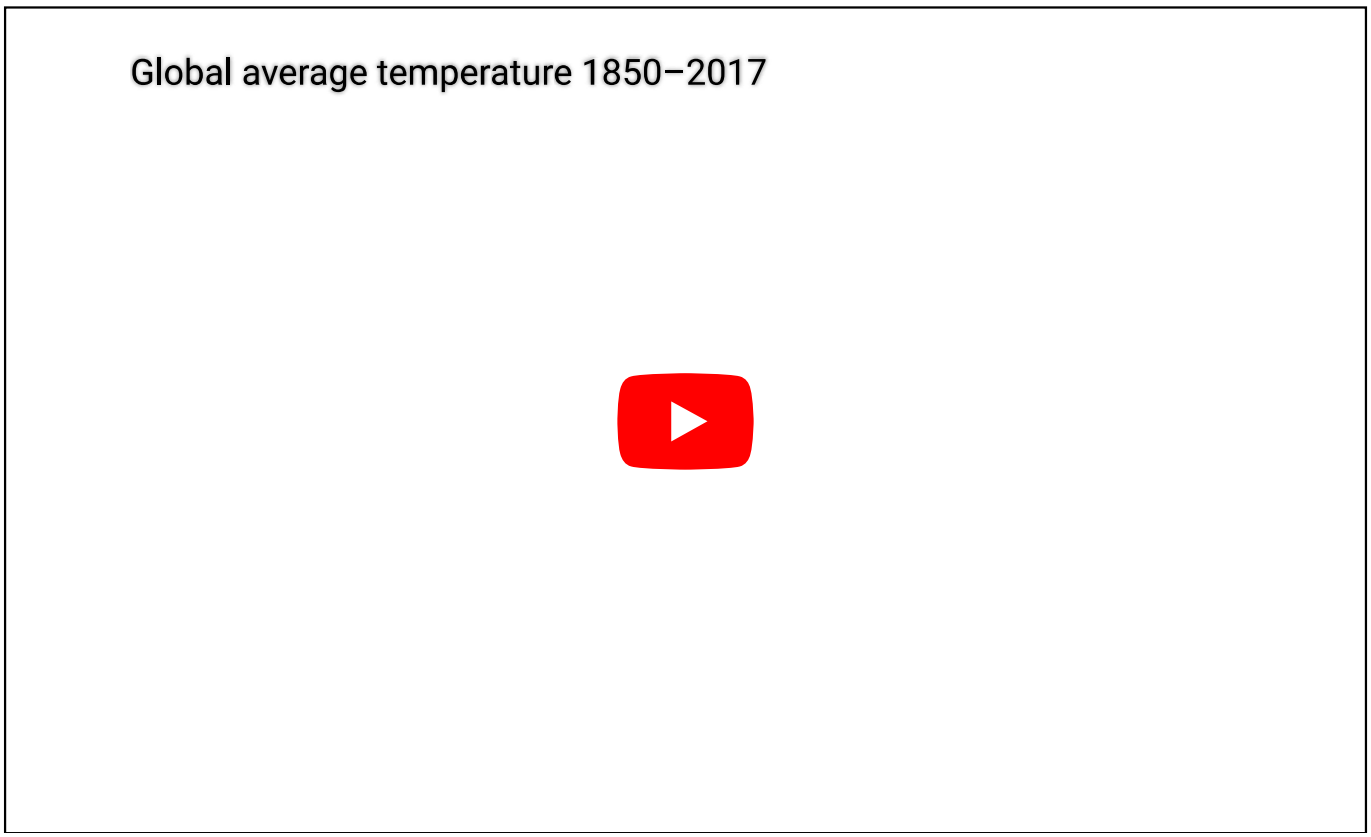
The Met Office annual average global temperature forecast for 2017 said the global mean temperature for 2017 was expected to be between 0.32 °C and 0.56 °C above the long-term (1981-2010) average. The provisional figure for 2017, based on an average of three global temperature datasets, of 0.42±0.1 °C above the long-term (1981–2010) average is well within the predicted range. The forecast, made at the end of 2016, also correctly predicted that 2017 would be one of the warmest years in the record.

The HadCRUT4 global temperature dataset is compiled from many thousands of temperature measurements taken across the globe, from all continents and all oceans. The regional variations in temperature are themselves informative in understanding the mechanisms that cause warming in response to the continuing build up of greenhouse gases in the atmosphere.

Prof Tim Osborn is the Director of Research at the University of East Anglia’s Climatic Research Unit. He said: “It isn't only the average global temperature that matters: we can also explain the geographical pattern of the

warming. Greater warming over land and in the Arctic regions, and less warming in the sub-polar oceans, are what we expect from our understanding of climate physics, and this is what we observe."

Uncertainties arising from incomplete global coverage, particularly a lack of observations from polar regions, and limitations of the measurements used to produce the data sets, have been included in the calculations. Professor Peter Stott, acting director of the Met Office Hadley Centre, added: "Remaining uncertainties are much smaller than the overall warming since pre-industrial times."



This animation shows global average temperatures for each year since 1850. The warmer and brighter the colour, the higher the overall value.

NASA and NOAA have also published their global mean temperature estimates for 2017 at 3.30pm today. Differences between the various estimates arise largely from the way that the data-sparse polar regions are handled. For further information, see our article on global temperatures in 2017.

John Kennedy, a Met Office climate scientist, will be hosting a global temperature Q&A session on Friday at 2pm.

The table below (based upon HadCRUT4) provides the temperature (anomaly) for each year between 2000 and 2017, relative to two long-term averages (of 1850-1900 and 1981 to 2010).

Year	Anomaly (°C relative to 1850–1900)	Uncertainty (±) (95% confidence range °C)	Anomaly (°C relative to 1981-2010)	Uncertainty (±) (95% confidence range °C)
2017	0.99	0.1	0.38	0.1
2016	1.11	0.1	0.50	0.1
2015	1.08	0.1	0.47	0.1
2014	0.89	0.1	0.29	0.1
2013	0.83	0.1	0.22	0.1
2012	0.79	0.1	0.18	0.1
2011	0.74	0.1	0.13	0.1
2010	0.87	0.1	0.27	0.1
2009	0.82	0.1	0.21	0.1
2008	0.71	0.1	0.10	0.1
2007	0.81	0.1	0.20	0.1
2006	0.82	0.1	0.21	0.1
2005	0.86	0.1	0.25	0.1

2004	0.76	0.1	0.15	0.1
2003	0.82	0.1	0.21	0.1
2002	0.81	0.1	0.20	0.1
2001	0.75	0.1	0.15	0.1
2000	0.61	0.1	0.00	0.1
1999	0.62	0.1	0.01	0.1
1998	0.85	0.1	0.25	0.1

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